

REMARKS

Claims 1-4 and 7-20 are pending in this application, of which 13-20 are withdrawn from consideration. Reconsideration of the rejections in view of these amendments and the following remarks is respectfully requested.

Rejections under 35 U.S.C. §112

Claims 1-4 and 7-10 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Accordingly, claims 1, 3-4 and 7-8 have been amended in order to more particularly point out and distinctly claim the subject matter to which the Applicants regard as their invention.

Regarding claim 1, “the rest portion” has been amended to read --a rest portion--.

Regarding claims 3 and 4, “a peripheral length of a cylinder is gradually increased” has been amended to read --a circumferential length of the cylindrical projection is gradually increased--.

Regarding to claims 7 and 8, “an inner surface of the storage electrode at a border portion between a side surface and a bottom surface” has been amended to read --at a border portion between a side surface and a bottom surface of the cylindrical-shaped storage electrode--.

Thus, the 35 U.S.C. §112, second paragraph, rejections should be withdrawn.

Rejection under 35 U.S.C. §102(b)

Claims 1-4, 7 and 8 stand rejected under 35 U.S.C. §102(b) as being anticipated by Yamada (U.S. Patent No. 5,023,683).

Applicants respectfully traverse this rejection.

Claims 1 recites “a cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the cylindrical-shaped storage electrode,” and “the edge of the cylindrical projection being rounded and having a larger thickness than a thickness in a rest portion.” Thus, the claimed semiconductor device has a feature that the storage electrode has a cylindrical projection, an edge of the cylindrical projection is located on an uppermost part of the storage electrode, and the edge of the cylindrical projection is rounded and has a large thickness than a thickness in a rest portion. Due to this structure, the electric field concentration on the upper cylinder edge of the storage electrode is mitigated to thereby preclude leakage current increase and dielectric breakdown of the capacitor dielectric film.

On the other hand, in Yamada, the storage electrode 10b has a cylindrical-shaped body as shown in FIG. 1b. However, an edge of the cylindrical-shaped body is not located on an uppermost part of the storage electrode 10b. The edge of the cylindrical-shaped body is instead located on the inter-layer insulation film 7a. The position of the edge of the cylindrical-shaped body does not correspond to the position of the uppermost part of the storage electrode 10b. Thus, the basic structure of the capacitor of Yamada is clearly different from that of the present invention.

Moreover, the edge of the cylindrical-shaped body of the storage electrode 10b of Yamada is not rounded, and the thickness of the edge thereof is not thickened. Yamada does not discuss the electric field concentration on the edge of the storage electrode. Thus, Yamada neither teaches nor suggests “a cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the cylindrical-shaped storage electrode,” and “the edge of the cylindrical projection being rounded and having a larger thickness than a thickness in a rest portion.”

For at least these reasons, independent claim 1 patentably distinguishes over Yamada. Claim 2-4, 7 and 8, depending from claim 1, also patentably distinguish over Yamada for at least the same reasons.

Thus, the 35 U.S.C. §102(b) rejection should be withdrawn.

Rejection under 35 U.S.C. §103(a)

Claims 9-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Nam et al (U.S. Patent No. 6,380,579).

Applicants respectfully traverse this rejection.

Claim 9 recites “a cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the cylindrical-shaped storage electrode,” and “the cylindrical-shaped storage electrode being formed of a metal film and having a larger thickness at the edge of the cylindrical projection than a thickness in a rest portion.”

U.S. Patent Application Serial No. 10/020,951

Also, claim 11 recites “a cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the cylindrical-shaped storage electrode,” and “the cylindrical-shaped storage electrode being formed of a metal film and the edge of the cylindrical projection being rounded.”

As discussed above, Yamada neither teaches nor suggests “a cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the cylindrical-shaped storage electrode,” and “the edge of the cylindrical projection being rounded and having a larger thickness than a thickness in a rest portion.”

Nam et al has been cited for allegedly disclosing a capacitor with a storage electrode formed of platinum. However, such disclosure does not remedy the deficiencies of Yamada. Nam et al does not discuss the electric field concentration on the edge of the storage electrode. Also, Nam et al neither teaches nor suggests that the edge shape of the metal film can be reconstituted into rounded or thickened shaped by the heat treatment. Thus, the one of ordinary skill in the art would not have been motivated to round and/or thicken the edge of the storage electrode of Nam et al.

Not trying to reshape the metal electrode of Nam!

For at least these reasons, independent claims 9 and 11 patentably distinguish over Yamada and Nam et al. Claim 10, depending from claim 9, and claim 12, depending from claim 11 also patentably distinguish over Yamada and Nam et al for at least the same reasons.

Thus, the 35 U.S.C. §103(a) rejection should be withdrawn.

U.S. Patent Application Serial No. 10/020,951

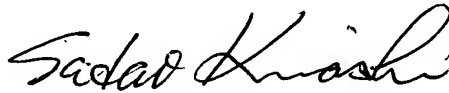
In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



Sadao Kinashi
Attorney for Applicants
Reg. No. 48,075

SK/fs
Atty. Docket No. **011724**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



23850

PATENT TRADEMARK OFFICE